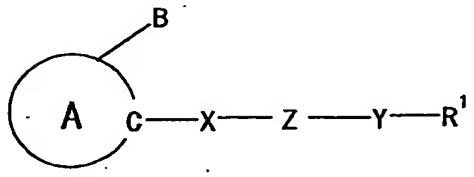
Claims

1. An agent for preventing or treating neuropathy, which comprises a compound represented by the formula:



(I)

wherein

ring A is a 5-membered aromatic heterocycle containing 2 or more nitrogen atoms, which may further have substituent(s);

B is an optionally substituted hydrocarbon group or an optionally substituted heterocyclic group;

X is a divalent acyclic hydrocarbon group;

Z is $-O-$, $-S-$, $-NR^2-$, $-CONR^2-$ or $-NR^2CO-$ (R^2 is a hydrogen atom or an optionally substituted alkyl group);

Y is a bond or a divalent acyclic hydrocarbon group; and

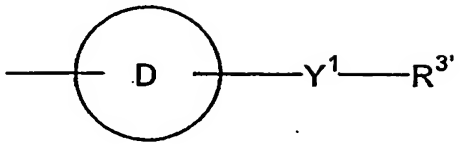
R^1 is an optionally substituted cyclic group, an optionally substituted amino group or an optionally substituted acyl group,

provided that when the 5-membered aromatic heterocycle represented by ring A is imidazole, then Z should not be $-O-$,

or a salt thereof.

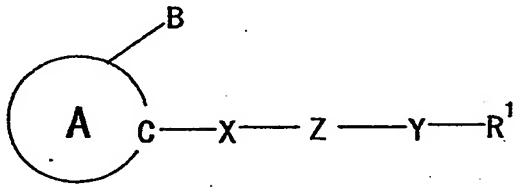
2. The agent of claim 1, wherein the 5-membered aromatic heterocycle represented by ring A is a pyrazole, oxadiazole, thiadiazole, triazole or tetrazole ring.

3. The agent of claim 1, wherein the optionally substituted cyclic group represented by R^1 is a group represented by the formula:



wherein D is a ring optionally further having substituents; Y^1 is a bond or a divalent acyclic hydrocarbon group; $R^{3'}$ is a group of the formula: $-SO_2R^4$, $-SOR^4$ or $-PO_3R^4R^5$ wherein R^4 and R^5 are the same or different and each is a hydrogen atom, a hydrocarbon group or a heterocyclic group, and R^4 and R^5 may form a heterocycle together with the adjacent oxo-substituted phosphorus atom and two oxygen atoms, or an optionally substituted heterocyclic group.

4. An agent for promoting production or secretion of a neurotrophic factor, which comprises a compound of the formula



(I)

wherein

ring A is a 5-membered aromatic heterocycle containing 2 or more nitrogen atoms, which may further have substituent(s);

B is an optionally substituted hydrocarbon group or an optionally substituted heterocyclic group;

X is a divalent acyclic hydrocarbon group;

Z is -O-, -S-, $-NR^2-$, $-CONR^2-$ or $-NR^2CO-$ (R^2 is a hydrogen atom or an optionally substituted alkyl group);

Y is a bond or a divalent acyclic hydrocarbon group; and

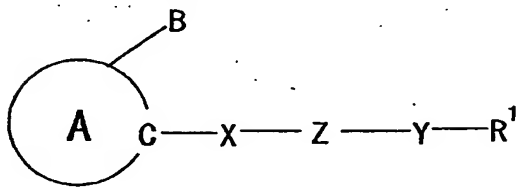
R^1 is an optionally substituted cyclic group, an optionally substituted amino group or an optionally substituted acyl group,

provided that when the 5-membered aromatic heterocycle represented by ring A is imidazole, then Z should not be -O-,

or a salt thereof.

5. The agent of claim 4, wherein the 5-membered aromatic heterocycle represented by ring A is a pyrazole, oxadiazole, thiadiazole, triazole or tetrazole ring.

6. An agent for ameliorating pain comprising a compound represented by the formula:



(I)

wherein

ring A is a 5-membered aromatic heterocycle containing 2 or more nitrogen atoms, which may further have substituent(s);

B is an optionally substituted hydrocarbon group or an optionally substituted heterocyclic group;

X is a divalent acyclic hydrocarbon group;

Z is $-O-$, $-S-$, $-NR^2-$, $-CONR^2-$ or $-NR^2CO-$ (R^2 is a hydrogen atom or an optionally substituted alkyl group);

Y is a bond or a divalent acyclic hydrocarbon group; and

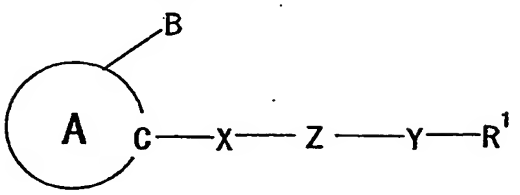
R^1 is an optionally substituted cyclic group, an optionally substituted amino group or an optionally substituted acyl group,

provided that when the 5-membered aromatic heterocycle represented by ring A is imidazole, then Z should not be $-O-$,

or a salt thereof.

7. The agent of claim 6, wherein the 5-membered aromatic heterocycle represented by ring A is a pyrazole, oxadiazole, thiadiazole, triazole or tetrazole ring.

8. A neuroprotective agent comprising a compound represented by the formula:



(I)

wherein

ring A is a 5-membered aromatic heterocycle containing 2 or more nitrogen atoms, which may further have substituent(s);

B is an optionally substituted hydrocarbon group or an optionally substituted heterocyclic group;

X is a divalent acyclic hydrocarbon group;

Z is $-O-$, $-S-$, $-NR^2-$, $-CONR^2-$ or $-NR^2CO-$ (R^2 is a hydrogen atom or an optionally substituted alkyl group);

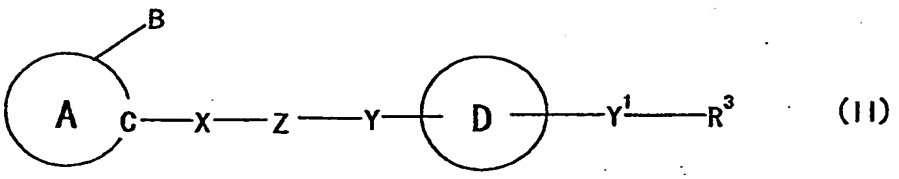
Y is a bond or a divalent acyclic hydrocarbon group; and

R^1 is an optionally substituted cyclic group, an optionally substituted amino group or an optionally substituted acyl group,

provided that when the 5-membered aromatic heterocycle represented by ring A is imidazole, then Z should not be $-O-$,

or a salt thereof.

9. A compound represented by the formula



(II)

wherein

ring A is a 5-membered aromatic heterocycle containing 2 or more nitrogen atoms, which may further have substituent(s);

B is an optionally substituted hydrocarbon group or an optionally substituted heterocyclic group;

X is a divalent acyclic hydrocarbon group;

Z is -O-, -S-, $-NR^2-$, $-CONR^2-$ or $-NR^2CO-$ (R^2 is a hydrogen atom or an optionally substituted alkyl group);

Y and Y^1 are the same or different and each is a bond or a divalent acyclic hydrocarbon group; and

D is a ring optionally further having substituent(s);

R^3 is an optionally substituted acyl group or an optionally substituted heterocyclic group,

provided that when the 5-membered aromatic heterocycle represented by ring A is imidazole, then Z should not be -O-,

and provided that when the 5-membered aromatic heterocycle represented by ring A is pyrazole, X is methylene, Z is -S- and Y is a bond, then the ring represented by D should not be oxadiazole,

or a salt thereof.

10. The compound of claim 9, wherein the 5-membered aromatic heterocycle represented by ring A is a pyrazole, oxadiazole, thiadiazole, triazole or tetrazole ring.

11. The compound of claim 9, wherein the optionally substituted acyl group represented by R^3 is a group of the formula: $-SO_2R^4$, $-SOR^4$ or $-PO_3R^4R^5$ wherein R^4 and R^5 are the same or different and each is a hydrogen atom, a hydrocarbon group or a heterocyclic group, and R^4 and R^5 may form a heterocycle together with the adjacent oxo-substituted phosphorus atom and two oxygen atoms.

12. The compound of claim 9, wherein the 5-membered aromatic heterocycle represented by ring A is a pyrazole ring.

13. The compound of claim 9, wherein B is an optionally substituted aromatic hydrocarbon group or an optionally substituted aromatic heterocyclic group.

14. The compound of claim 9, wherein X is a divalent C_{1-8} aliphatic hydrocarbon group.

15. The compound of claim 9, wherein Z is $-CONR^2-$ (R^2 is a hydrogen atom or an optionally substituted alkyl group).

16. The compound of claim 9, wherein Y is a bond or a C_{1-4} alkylene.

17. The compound of claim 9, wherein Y^1 is a bond or a C_{1-4} alkylene.

18. The compound of claim 9, wherein the ring represented by D is a C_{6-14} aromatic hydrocarbon ring.

19. The compound of claim 9, which is diethyl [4-({(2E)-3-[5-(4-fluorophenyl)-1-methyl-1H-pyrazol-4-yl]prop-2-enoyl}amino)benzyl]phosphonate;
(2E)-N-{4-[(2,4-dioxo-1,3-thiazolidin-5-yl)methyl]phenyl}-3-[5-(4-fluorophenyl)-1-methyl-1H-pyrazol-4-yl]acrylamide;
(2E)-3-[5-(4-fluorophenyl)-1-methyl-1H-pyrazol-4-yl]-N-[4-(1H-imidazol-1-ylmethyl)phenyl]acrylamide;
(2E)-3-[5-(4-fluorophenyl)-1-methyl-1H-pyrazol-4-yl]-N-[4-(1H-pyrazol-1-ylmethyl)phenyl]acrylamide;
diethyl [4-({(2E)-3-[1-methyl-5-(2-thienyl)-1H-pyrazol-4-yl]prop-2-enoyl}amino)benzyl]phosphonate;

(2E)-3-[5-(4-fluorophenyl)-1-methyl-1H-pyrazol-4-yl]-N-{4-[(3-methyl-2,4-dioxo-1,3-thiazolidin-5-yl)methyl]phenyl}acrylamide;

(2E)-N-[4-(1H-benzimidazol-1-ylmethyl)phenyl]-3-[5-(4-fluorophenyl)-1-methyl-1H-pyrazol-4-yl]acrylamide;

(2E)-3-[5-(4-fluorophenyl)-1-methyl-1H-pyrazol-4-yl]-N-{4-[(methylsulfonyl)methyl]phenyl}acrylamide;

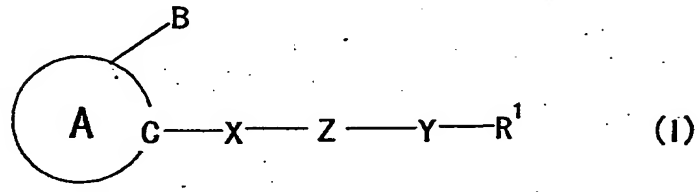
(2E)-3-[5-(4-fluorophenyl)-1-methyl-1H-pyrazol-4-yl]-N-{4-[hydroxy(2-pyridinyl)methyl]phenyl}acrylamide;

(2E)-3-[5-(4-fluorophenyl)-1-methyl-1H-pyrazol-4-yl]-N-[4-(4-morpholinylmethyl)phenyl]acrylamide; or

(2E)-N-{4-[(ethylsulfonyl)methyl]phenyl}-3-[5-(4-fluorophenyl)-1-methyl-1H-pyrazol-4-yl]acrylamide.

20. A pharmaceutical agent comprising the compound of claim 9 or a prodrug thereof.

21. A method for preventing or treating neuropathy in a mammal, which comprises administering a compound represented by the formula:



(I)

wherein

ring A is a 5-membered aromatic heterocycle containing 2 or more nitrogen atoms, which may further have substituent(s);

B is an optionally substituted hydrocarbon group or an optionally substituted heterocyclic group;

X is a divalent acyclic hydrocarbon group;

Z is $-O-$, $-S-$, $-NR^2-$, $-CONR^2-$ or $-NR^2CO-$ (R^2 is a hydrogen atom or an optionally substituted alkyl group);

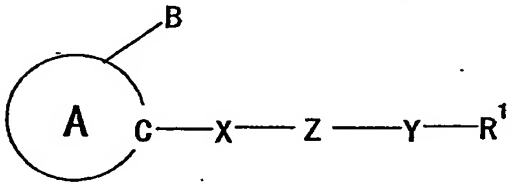
Y is a bond or a divalent acyclic hydrocarbon group; and

R^1 is an optionally substituted cyclic group, an optionally substituted amino group or an optionally substituted acyl group,

provided that when the 5-membered aromatic heterocycle represented by ring A is imidazole, then Z should not be -O-,

or a salt thereof, to said mammal.

22. A method for promoting production or secretion of a neurotrophic factor in a mammal, which comprises administering a compound represented by the formula:



(I)

wherein

ring A is a 5-membered aromatic heterocycle containing 2 or more nitrogen atoms, which may further have substituent(s);

B is an optionally substituted hydrocarbon group or an optionally substituted heterocyclic group;

X is a divalent acyclic hydrocarbon group;

Z is -O-, -S-, $-NR^2-$, $-CONR^2-$ or $-NR^2CO-$ (R^2 is a hydrogen atom or an optionally substituted alkyl group);

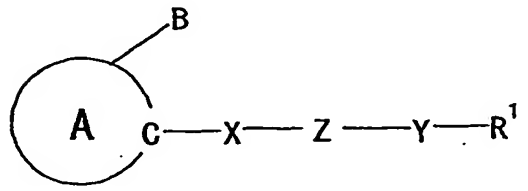
Y is a bond or a divalent acyclic hydrocarbon group; and

R^1 is an optionally substituted cyclic group, an optionally substituted amino group or an optionally substituted acyl group,

provided that when the 5-membered aromatic heterocycle represented by ring A is imidazole, then Z should not be -O-,

or a salt thereof, to said mammal.

23. A method for ameliorating pain in a mammal, which comprises administering a compound represented by the formula:



(I)

wherein

ring A is a 5-membered aromatic heterocycle containing 2 or more nitrogen atoms, which may further have substituent(s);

B is an optionally substituted hydrocarbon group or an optionally substituted heterocyclic group;

X is a divalent acyclic hydrocarbon group;

Z is $-O-$, $-S-$, $-NR^2-$, $-CONR^2-$ or $-NR^2CO-$ (R^2 is a hydrogen atom or an optionally substituted alkyl group);

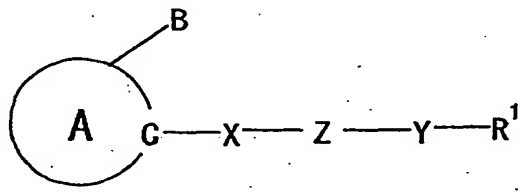
Y is a bond or a divalent acyclic hydrocarbon group; and

R^1 is an optionally substituted cyclic group, an optionally substituted amino group or an optionally substituted acyl group,

provided that when the 5-membered aromatic heterocycle represented by ring A is imidazole, then Z should not be $-O-$,

or a salt thereof, to said mammal.

24. A method for protecting a nerve in a mammal, which comprises administering a compound represented by the formula:



(I)

wherein

ring A is a 5-membered aromatic heterocycle containing 2 or more nitrogen atoms, which may further have substituent(s);

B is an optionally substituted hydrocarbon group or an optionally substituted heterocyclic group;

X is a divalent acyclic hydrocarbon group;

Z is -O-, -S-, $-NR^2-$, $-CONR^2-$ or $-NR^2CO-$ (R^2 is a hydrogen atom or an optionally substituted alkyl group);

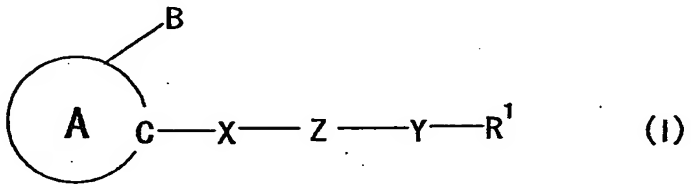
Y is a bond or a divalent acyclic hydrocarbon group; and

R^1 is an optionally substituted cyclic group, an optionally substituted amino group or an optionally substituted acyl group,

provided that when the 5-membered aromatic heterocycle represented by ring A is imidazole, then Z should not be -O-,

or a salt thereof, to said mammal.

25. Use of a compound represented by the formula:



(I)

wherein

ring A is a 5-membered aromatic heterocycle containing 2 or more nitrogen atoms, which may further have substituent(s);

B is an optionally substituted hydrocarbon group or an optionally substituted heterocyclic group;

X is a divalent acyclic hydrocarbon group;

Z is -O-, -S-, $-NR^2-$, $-CONR^2-$ or $-NR^2CO-$ (R^2 is a hydrogen atom or an optionally substituted alkyl group);

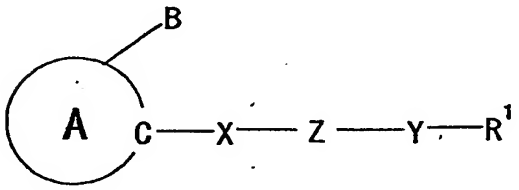
Y is a bond or a divalent acyclic hydrocarbon group; and

R^1 is an optionally substituted cyclic group, an optionally substituted amino group or an optionally substituted acyl group,

provided that when the 5-membered aromatic heterocycle represented by ring A is imidazole, then Z should not be -O-,

or a salt thereof, for the production of an agent for preventing or treating neuropathy.

26. Use of a compound represented by the formula:



(I)

wherein

ring A is a 5-membered aromatic heterocycle containing 2 or more nitrogen atoms, which may further have substituent(s);

B is an optionally substituted hydrocarbon group or an optionally substituted heterocyclic group;

X is a divalent acyclic hydrocarbon group;

Z is -O-, -S-, $-NR^2-$, $-CONR^2-$ or $-NR^2CO-$ (R^2 is a hydrogen atom or an optionally substituted alkyl group);

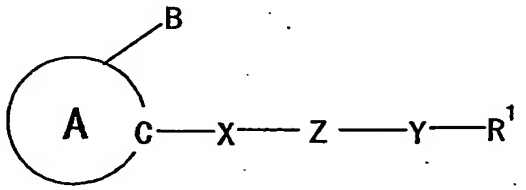
Y is a bond or a divalent acyclic hydrocarbon group; and

R^1 is an optionally substituted cyclic group, an optionally substituted amino group or an optionally substituted acyl group,

provided that when the 5-membered aromatic heterocycle represented by ring A is imidazole, then Z should not be -O-,

or a salt thereof, for the production of an agent for promoting production or secretion of a neurotrophic factor.

27. Use of a compound represented by the formula:



(I)

wherein

ring A is a 5-membered aromatic heterocycle containing 2 or more nitrogen atoms, which may further have substituent(s);

B is an optionally substituted hydrocarbon group or an optionally substituted heterocyclic group;

X is a divalent acyclic hydrocarbon group;

Z is -O-, -S-, $-NR^2-$, $-CONR^2-$ or $-NR^2CO-$ (R^2 is a hydrogen atom or an optionally substituted alkyl group);

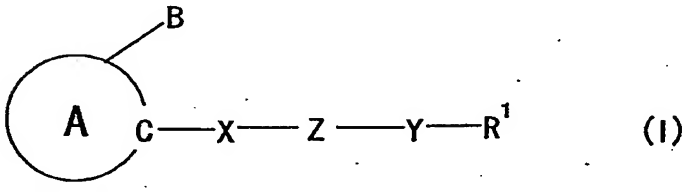
Y is a bond or a divalent acyclic hydrocarbon group; and

R^1 is an optionally substituted cyclic group, an optionally substituted amino group or an optionally substituted acyl group,

provided that when the 5-membered aromatic heterocycle represented by ring A is imidazole, then Z should not be -O-,

or a salt thereof, for the production of an agent for ameliorating pain.

28. Use of a compound represented by the formula:



(I)

wherein

ring A is a 5-membered aromatic heterocycle containing 2 or more nitrogen atoms, which may further have substituent(s);

B is an optionally substituted hydrocarbon group or an optionally substituted heterocyclic group;

X is a divalent acyclic hydrocarbon group;

Z is -O-, -S-; $-NR^2-$, $-CONR^2-$ or $-NR^2CO-$ (R^2 is a hydrogen atom or an optionally substituted alkyl group);

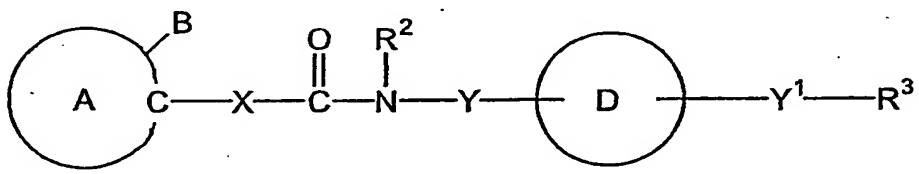
Y is a bond or a divalent acyclic hydrocarbon group; and

R^1 is an optionally substituted cyclic group, an optionally substituted amino group or an optionally substituted acyl group,

provided that when the 5-membered aromatic heterocycle represented by ring A is imidazole, then Z should not be -O-,

or a salt thereof, for the production of a neuroprotective agent.

29. A production method of a compound represented by the formula:



wherein

ring A is a 5-membered aromatic heterocycle containing 2 or more nitrogen atoms, which may further have substituent(s);

B is an optionally substituted hydrocarbon group or an optionally substituted heterocyclic group;

X is a divalent acyclic hydrocarbon group;

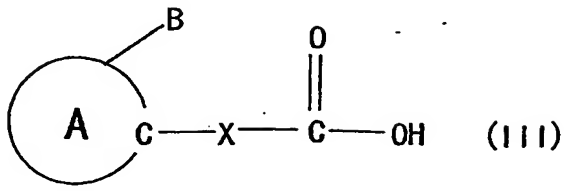
R^2 is a hydrogen atom or an optionally substituted alkyl group;

Y and Y^1 are the same or different and each is a bond or a divalent acyclic hydrocarbon group;

D is a ring optionally further having substituent(s); and

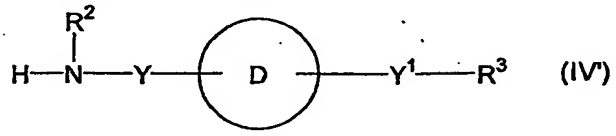
R^3 is an optionally substituted acyl group or an optionally substituted heterocyclic group,

or a salt thereof, which comprises reacting a compound represented by the formula:



(III)

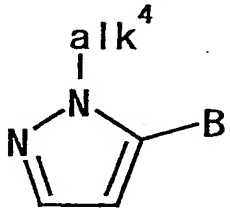
wherein each symbol is as defined above, or a salt thereof, with a compound represented by the formula:



(IV')

wherein each symbol is as defined above, or a salt thereof.

30. A production method of a compound represented by the formula:



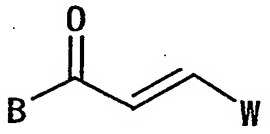
(XVI)

wherein

B is an optionally substituted hydrocarbon group or an optionally substituted heterocyclic group, and

alk^4 is a C_{1-6} alkyl group or a C_{7-13} aralkyl group,

or a salt thereof, which comprises reacting a compound represented by the formula:



(XV)

wherein W is -OH or $-N(alk^2)(alk^3)$ wherein alk^2 and alk^3 are the same or different and each is a C_{1-6} alkyl group, and B is as defined above, or a salt thereof, with a C_{1-6} alkylhydrazine or a C_{7-13} aralkylhydrazine in the presence of an acid.